ABHAY VENKATESH

CURRICULUM VITAE

As of July 2, 2021

abhay.venkatesh@gmail.com · abhayvenkatesh.com

OVERVIEW

- Abhay Venkatesh is a *Tech Lead* at Anduril Industries, where he focuses on Autonomy Infrastructure, Simulation Infrastructure, Command-And-Control, and Lattice

- Abhay is mentored by **Jared Newman**, *Head of Platform* at Anduril, and **Nabil Enayet**, *Group Lead for Platform* at Anduril

- Prior to his Tech Lead role, Abhay worked directly under **Brian Schimpf**, *CEO and Co-Founder of Anduril, and ex-Director of Engineering at Palantir*, on Perception problems ranging from Edge Inference, Quantized Learning and Inference, to Object Detection and Mapping

- Abhay has also worked at Facebook as a *Software Engineer Intern* on the News Feed Integrity Team, where he worked on machine learning, modeling, and product to improve the quality of the Facebook News Feed

- At Stanford University, Abhay was a *Research Intern* working on Robotics, Human-Computer Interaction, and Software Platform research advised by **Dr. Wendy Ju**, and **Dr. Michael Bernstein**

- Abhay graduated from the University of Wisconsin-Madison with *Distinction and Departmental Honors with a Bachelor of Science in Computer Sciences and Mathematics*

- At the University of Wisconsin-Madison as an *Research Assistant*, Abhay worked on Computer Science research, focusing on Machine Learning, Computer Vision, Robotics, Human-Computer Interaction, Internet of Things, and Big Data Systems

- For his Machine Learning and Computer Vision Research, Abhay was advised by **Dr. Vikas Singh**, *Professor of Computer Science and Bioinformatics* at the University of Wisconsin-Madison

- For his Big Data Systems Research, Abhay was advised by **Dr. Shivaram Venkataram**, *Assistant Professor of Computer Science* at the University of Wisconsin-Madison

- For his Human-Computer Interaction and Robotics Research, Abhay was advised by **Dr. Bilge Mutlu**, *Professor of Computer Science* at the University of Wisconsin-Madison

- In High School, Abhay was the *Valedictorian* for his breadth of excellence ranging from music and competitive quizzing to academics and entrepreneurship

EXPERIENCE

Anduril Industries   Irvine, CA
Software Engineer   May 2019 —

- Command-And-Control Architecture

- Simulation Infrastructure

  - Tech Lead and Product Manager

- Management

  - Implemented new RFC system
  - Implemented new ownership model
  - Thought Leadership through Anduril's internal Platform Blog (e.g. released "Platforms vs. Algorithms" piece)
  - Mentored 5 engineers

- Mission Autonomy Architecture
  - APIs
  - Backend Services
- Sensor Infrastructure Architecture
- C++ Infrastructure Architecture
  - Application Infrastructure
  - Core Libraries
  - Build Infrastructure
- Networking/Data Systems Backend
  - Bandwidth Efficient Pub/Sub
- Space Sensor Network Simulation
- Systems Software - Hardware Images
  - Sentry Tower, Ghost, Dust
- Perception
  - Mapping
  - Object Detection
  - Quantized Learning and Inference
- Employee #47

University of Wisconsin-Madison   Irvine, CA
Research Assistant   September 2016 — May 2019

- Machine Learning and Computer Vision Research under Dr. Vikas Singh
  - Research topics included Novel Activation Functions, Semi-Supervised Learning, Computer Vision, Semantic Segmentation, Data-Dependent Regularizers, Drones
  - Industrial Collaboration with American Family Insurance targeting automated insurance claim verification
- Big Data Systems Research under Dr. Shivaram Venkataraman
  - Research topics included machine learning, data loading, cluster scheduling
  - Industrial collaboration with Microsoft Research
- Robotics and HCI Research under Dr. Bilge Mutlu
  - Research focus on Collaborative Industrial Robots
  - In collaboration with MIT CSAIL
- IoT Research at the IoT Lab focusing on Computer Vision and Smart Homes

Facebook, Inc.   Menlo Park, CA
Software Engineer Intern   May 2018 — August 2018

- News Feed Integrity Team
- Broad Trust: built data models and analytics dashboards for i8n launch
- Common Ground and Polarization: built new ranking algorithm based on an unsupervised model, ran experiment on 1% of Facebook's users
- Article Context: built article-to-context mapping system with 99% precision and 99% recall
- Received full-time return offer

Stanford University   Stanford, CA
Research Intern   June 2017 — September 2017

- Multi-Robot Interaction project under Dr. Wendy Ju

- Daemo, a crowdsourcing platform, under Dr. Michael Bernstein

Startup at Top Business School
Product Manager Intern   May 2016 — August 2016

- Market research, pricing analysis, competitive analysis

- UX research, helped identify improvements to reduce attrition by 15%

EDUCATION

Stanford University	Stanford, CA
Computer Science (Non-Degree)	*Summer Session (GPA 4.0)*
University of Southern California	Los Angeles, CA
B.S. Computer Science	*Admitted but did not enroll*
University of Wisconsin-Madison	Madison, WI
B.S. Mathematics, Computer Sciences (Honors)	*Graduated with Distinction*

PUBLICATIONS

Generating Accurate Pseudo-Labels in Semi-Supervised Learning and Avoiding Overconfident Predictions via Hermite Polynomial Activations, CVPR 2020
Generating Accurate Pseudo-labels via Hermite Polynomials for SSL Confidently, MMLS 2019, Best Student Paper
Nondecomposable Data Dependent Regularizers offer Significant Performance Gains, DeepMath 2019
Optimizing Nondecomposable Data Dependent Regularizers via Lagrangian Reparameterization offers Significant Performance and Efficiency Gains, AAAI 2019, Ranking method on the Microsoft COCO Leaderboard
The Case for Unifying Data-loading in Machine Learning Clusters, HotCloud 2019, In Collaboration with Microsoft Research
Learning View Invariant Semantic Segmentation for UAV Video Sequences, SDM 2018, In Collaboration with American Family Insurance Research

TEST SCORES

GRE Composite *336\340*
GRE Analytical Writing *99th Percentile*
GRE Verbal Reasoning *98th Percentile*
GRE Quantitative Reasoning *168\170*
SAT Math *97th Percentile*

HIGHLIGHTED COURSEWORK

Stanford CS 161 *Design and Analysis of Algorithms*
UW-Madison CS 838 *Graduate Learning Methods in Computer Vision*, Professor Yin Li
UW-Madison CS 766 *Graduate Computer Vision*, Professor Mohit Gupta
UW-Madison CS 760 *Graduate Machine Learning*, Professor David Page
UW-Madison CS 744 *Graduate Big Data Systems*, Professor Shivaram Venkataraman
UW-Madison CS 564 *Database Management Systems*, Professor Theodoros Rekatsinas
UW-Madison CS 540 *Artificial Intelligence*, Professor Jerry Zhu
UW-Madison CS 537 *Operating Systems*, Professor Remzi Arpaci-Dusseau
UW-Madison Math 531 *Advanced Probability Theory*
UW-Madison Math 525 *Linear Programming*
UW-Madison Math 521 *Analysis I*
UW-Madison Math 522 *Analysis II*

AWARDS

Edison Award	USA
Awarded to Anduril for the Ghost Product which Abhay contributed to	2021
Best Student Paper	USA
Midwest Machine Learning Symposium	2019
Cornell, Maryland, and Max Planck Pre-Doctoral Research Fellowship	Germany

Internationally recognized award, fully-funded seminar at the Max-Planck Institute	2018
Hilldale Undergraduate Research Fellowship	Madison, WI
Research award and funding	2018
Phi Kappa Phi Nominee	Madison, WI
Top 7.5% of all juniors	2018
Course Citation	Madison, WI
CS 564: Database Management Systems	
Won a Google Home for being the most active student on the course's discussion board	2018
The Hub CS Club Coding Competition	Madison, WI
1st place	March, 2017
Award Winning Exhibit	Madison, WI
Wisconsin Engineering EXPO	March, 2017
Dean's Award of Excellence	Madison, WI
Awarded to Madison Enactus for which Abhay was the VP of Technology	2016
Best Social Entrepreneurship Project, Transcend	Madison, WI
Awarded to Madison Enactus for which Abhay was the VP of Technology	2016
John W. Jung Memorial Scholarship	Madison, WI
Awarded by UW-Madison for leadership, excellence, and service.	2016
Dean's List	Madison, WI
University of Wisconsin-Madison	2016
High School Valedictorian	
To the best overall student	December, 2014
National 3rd Place in Top Tech Quiz	
World's largest high school tech quiz	
Prestigious national award out of 15,000 participants across the country	December, 2014
Acknowledgement by Head of State, now Head of National Government	
For founding a successful not-for-profit	December, 2014
State Recommendation	
For founding a successful not-for-profit	December, 2014

LEADERSHIP

Speaker *MIT XFair Tech Talk*	2021
Judge *Contrary Talent Hacks*	February, 2021
Judge *DubHacks*	October, 2020
Judge *HackThis by HackIllinois*	August, 2020
Judge *GarudaHacks*	August, 2020
President, Co-Founder *AI at UW, ai.cs.wisc.edu*	2017
VP of Technology *Madison Enactus*	2016
Executive *The Hub CS Club*	2016
Chief Technology Officer *Insight Wisconsin*	2016
Executive *Transcend*	2015
Co-Founder *Model United Nations*	2014
Co-Founder *Soccer Cup*	2014
Co-Founder *Student Parliament*	2013
Quizmaster *Top Engineering University*	2013

ORGANIZATIONS

Contrary Talent 2020 Fellow, Around 100 selected from a highly competitive pool of 2200+ top early-career professionals in the USA

PROJECTS

Application Infrastructure for Deployment Designed and implemented application infrastructure for deployment in C++

Data System Client Libraries Implemented client libraries for our core data systems in C++ and Go

Simulation Platform Infrastructure Simulation platform infrastructure for robots, Kubernetes for container orchestration, GoLang for backend systems, Python for scripting

Command-And-Control Framework A framework for writing command-and-control applications, implemented using Protocol Buffers

Efficient Pub-Sub on Mesh Network Bandwidth-efficient distributed publish-subscribe system implemented in GoLang

C++ Polyrepo with Nix A novel polyrepo architecture for C++ projects using Nix

Hardware OS Images with Nix Imaging Nvida TX2 and Xavier Linux Operating Systems and Kernel with Nix

Mission Autonomy System Ground-breaking complex distributed system for robots implemented in C++ and GoLang, solves multi-asset robot tasking and execution

Space Sensor Network Simulation Simulated space sensor network for tracking satellites, backend using GoLang, sensor simulation using Python

Drone Mapping System Generating 2D maps from overhead imagery extracted from a drone, backend systems using GoLang

Drone Object Detection System Detecting objects on a drone, implemented using Nvidia Tegra and TensorRT

Quantized Inference for Edge AI Quantized learning and inference for low-power edge devices, models trained in PyTorch and TensorFlow, Google Edge TPU for inference

OneAccess Data loading systems for machine learning implemented with Python, implements efficient sampling algorithms for optimal data access patterns, machine learning models implemented using PyTorch

Learning with Hermite Polynomials Demonstrating superior semi-supervised learning with Hermite Polynomials, models trained using PyTorch

Learning with Data-Dependent Regularizers Learning semantic segmentation with data-dependent regularizers, models trained using PyTorch, built custom optimizer for novel iterative gradient algorithm

Learning with Conditional Generative Adversarial Networks Generating training data for drone vision models using conditional generative adversarial networks, dataset generated using Python and Unreal Engine, models trained using PyTorch

Diabetic Retinopathy Detection Detecting diabetic retinopathy using K-Nearest Neighbors, Logistic Regression, LeNet, GoogLeNet, models trained using Python and TensorFlow

View-Invariant Semantic Segmentation Learning view-invariant semantic segmentation for UAVs, dataset generation using Python and Unreal Engine, model training and inference using TensorFlow

Daemo Frontend/Backend Built features for the Daemo Crowdsourcing Platform using Django/Python and AngularJS/JavaScript

ChairBot Interface and Backend Built interface and backend using Swift/NodeJS for the "ChairBot" robot, a chair that moves around and interacts with humans

Polarization Model and Ranking Experiment Launching a ranking experiment on 1% of Facebook's users based on an Unsupervised Classification of User Polarization

Article Context Mapping System Implemented an "Article to Context Link" mapping system in PHP, achieved 99% precision and 99% recall

Broad Trust i18n Analytics and Monitoring Built databases, dashboards, and other monitoring/analytics tooling using SQL for the Broad Trust i18n launch to 7 countries

CV-Enabled Smart Home Automated smart home that responds to user activity using Computer Vision implemented in Python

UI for Collaborative Robots Task authoring environment for collaborative industrial robots built using JavaScript/AngularJS

SKILLS

Programming Languages C++, GoLang, Python, Nix, Java, JavaScript, Bash

Domain Expertise Backend Product, Backend Systems, Robotics, Big Data Systems, Machine Learning, Computer Vision, C++ Infrastructure, Cloud Deployment, CI/CD

Technologies PyTorch, Docker, Kubernetes, TensorFlow, CircleCI, Git/GitHub, Linux

Business Technical Leadership, Entrepreneurship, Backend Product Management, Technical Writing, Sprint Management, Technical Execution, Computer Science Research

REFERENCES

Jared Newman, Head of Platform at Anduril Industries

Nabil Enayet, Platform Group Lead at Anduril Industries

Dr. Vikas Singh, Professor of Computer Sciences and Bioinformatics at the University of Wisconsin-Madison

Brian Schimpf, CEO and Co-Founder at Anduril Industries, ex-Director of Engineering at Palantir

Dr. Shivaram Venkataraman, Assistant Professor of Computer Sciences at the University of Wisconsin-Madison

Dr. Theodoros Rekatsinas, Assistant Professor of Computer Sciences at the University of Wisconsin-Madison

Dr. Bilge Mutlu, Professor of Computer Sciences at the University of Wisconsin-Madison